

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A fuel cell electrical power generation system comprising:

a reformer (5) through which an oxygen-containing gas and a source gas are flowed and which has a catalytic part for causing the partial oxidation of hydrocarbons contained in said source gas, and

a solid electrolyte fuel cell (7) which is disposed downstream of said reformer (5) and which has a cell main unit which includes: a fuel electrode (35) which is supplied with a partial oxidation gas which contains hydrogen generated as a result of the flowing of said source gas and said oxygen-containing gas through said reformer (5); an oxygen electrode (31) which is supplied with an oxygen-containing gas; and an electrolyte (33) which lies between said fuel electrode (35) and said oxygen electrode (31), wherein an electrode reaction of said partial oxidation gas and said oxygen-containing gas is caused to take place in said fuel electrode (35), said oxygen electrode (31) and said electrolyte (33), and said fuel cell having a temperature that is below a minimum operating temperature.

2. (Currently Amended) A fuel cell electrical power generation system comprising:

a reformer (5) having a catalytic part which when a source gas is flowed therethrough converts hydrocarbons, contained in said source gas and having a carbon number equal to or greater than 2, into methane under the presence of hydrogen, and which when an oxygen-containing gas and said source gas are flowed therethrough causes the partial oxidation of hydrocarbons contained in said source gas, and

a solid electrolyte fuel cell (7) which is disposed downstream of said reformer (5) and which has a cell main unit which includes: a fuel electrode (35) which is supplied with a hydrogen-containing gas; an oxygen electrode (31) which is supplied with an oxygen-containing gas; and an electrolyte (33) which lies between said fuel electrode (35) and said oxygen electrode (31), wherein an electrode reaction of said hydrogen-containing gas and said oxygen-containing gas is caused to take place in said fuel electrode (35), said oxygen electrode (31) and said electrolyte (33),

said fuel cell electrical power generation system performing:

a startup operation in which said source gas and said oxygen-containing gas are flowed through said catalytic part of said reformer (5), and a partial oxidation gas which contains hydrogen generated as a result of the flowing of said source gas and said oxygen-containing gas through said reformer (5) is supplied to said fuel electrode (35) as said hydrogen-containing gas, and

a normal operation in which said source gas is flowed through said catalytic part of said reformer (5) and a fuel gas which contains methane generated as a result of the flowing of said source gas through said reformer (5) is supplied to said fuel electrode (35).

3. (Currently Amended) The fuel cell electrical power generation system of claim 1 or claim 2 further comprising:

a first heat exchange means (6) for performing heat exchange between said source gas and said oxygen-containing gas prior to their entry into said reformer (5) and said partial oxidation gas discharged out of said reformer (5).

4. (Currently Amended) The fuel cell electrical power generation system of claim 1 or claim 2 further comprising:

a first combustion means (4) for burning said source gas and said oxygen-containing gas during a startup phase of said reformer (5), and

a first combustion gas supply means (46) for supplying to said reformer (5) a combustion gas generated as a result of the burning of said source gas and said oxygen-containing gas in said first combustion means (4) so that said reformer (5) is heated.

5. (Currently Amended) The fuel cell electrical power generation system of claim 1 or claim 2 further comprising:

a second combustion means (8) for burning said source gas and said oxygen-containing gas before said electrode reaction starts taking place, and

a ~~second~~ combustion gas supply means (~~57, 59~~) for supplying to said oxygen electrode (~~31~~) a combustion gas generated as a result of the burning of said source gas and said oxygen-containing gas in said ~~second~~ combustion means (~~8~~) so that said oxygen electrode (~~31~~) is heated.

6. (Currently Amended) The fuel cell electrical power generation system of claim 1 or claim 2 further comprising:

a ~~third~~ combustion means (~~12~~) for burning said a source gas and a first oxygen-containing gas,

a ~~second~~ heat exchange means (~~93~~) for performing heat exchange between a combustion gas generated as a result of the burning of said source gas and said first oxygen-containing gas in said ~~third~~ combustion means (~~12~~) and a second oxygen-containing gas different from said first oxygen-containing gas, and

oxygen-containing gas supply means (~~75, 83, 87~~) for supplying to either or both said reformer (~~5~~) and said oxygen electrode (~~31~~) said second oxygen-containing gas heated by said ~~second~~ heat exchange means (~~93~~).

7. (New) The fuel cell electrical power generation system of claim 1, wherein said minimum operating temperature is approximately 700 degrees Centigrade.

8. (New) A method of generating fuel cell electrical power, comprising the steps of:

converting hydrocarbons, contained in a source gas and having a carbon number equal to or greater than 2, into methane under the presence of hydrogen in a reformer when said source gas is flowed therethrough;

generating a partial oxidation gas which contains hydrogen by causing a partial oxidation of hydrocarbons contained in said source gas in said reformer when said source gas and an oxygen-containing gas are flowed therethrough;

causing an electrode reaction of a hydrogen-containing gas and said oxygen-containing gas in a solid electrolyte fuel cell, which is disposed downstream of said reformer and has a cell main unit which includes: a fuel electrode which is supplied with said hydrogen-containing gas;

an oxygen electrode which is supplied with said oxygen-containing gas; and an electrolyte which lies between said fuel electrode and said oxygen electrode; and

performing a startup operation in which said source gas and said oxygen-containing gas are flowed through said reformer, and said partial oxidation gas is supplied to said fuel electrode as said hydrogen-containing gas and a normal operation in which said source gas is flowed through said reformer and a fuel gas containing said methane is supplied to said fuel electrode as said hydrogen-containing gas.

9. (New) The method of claim 8, wherein the step of performing said startup operation, said fuel cell has a temperature below a minimum operating temperature of approximately 700 degrees Centigrade.

10. (New) The method of claim 8, wherein the step of performing said startup operation, said fuel cell is heated by a heat held in said partial oxidation gas and a heat associated with said electrode reaction.

11. (New) The method of claim 8, further comprising the step of:
performing heat exchange between said source gas and said oxygen-containing gas prior to their entry into said reformer and said partial oxidation gas discharged out of said reformer.

12. (New) The method of claim 8, further comprising the steps of:
burning said source gas and said oxygen-containing gas during a startup phase of said reformer; and

supplying to said reformer a combustion gas generated as a result of the burning of said source gas and said oxygen-containing gas so that said reformer is heated.

13. (New) The method of claim 8, further comprising the steps of:
burning said source gas and said oxygen-containing gas before said electrode reaction starts taking place; and

supplying to said oxygen electrode a combustion gas generated as a result of the burning of said source gas and said oxygen-containing gas so that said oxygen electrode is heated.

14. (New) The method of claim 8, further comprising the steps of:

burning said source gas and a first oxygen-containing gas;

performing heat exchange between a combustion gas generated as a result of the burning of said source gas and said first oxygen-containing gas and a second oxygen-containing gas different from said first oxygen-containing gas; and

supplying to either or both said reformer and said oxygen electrode said second oxygen-containing gas that is heated.